

REMARKS

Initially, in the Decision on Petition dated March 24, 2005, the Examiner notes that the Petition to Make Special filed December 29, 2004 is defective for failing to provide a complete detailed discussion of the most closely related references with the necessary specificity. In addition, the Examiner notes that the discussion of the references should be directed to how the language of each of the independent claims is specifically distinguishable and patentable from the references provided.

The present invention as recited in the claims is directed to, among other things, a cache control method in a computer system, in which a storage device, a node device including a disk device for cache and clients are connected together, for controlling the cache in the disk device, that includes: in the storage device or the client, sending attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be cached in the disk device; in the node device, judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information; and relaying the data, which has been judged as non-cacheable, without process of the cache in the disk device.

It is submitted that the cited references, whether considered alone or in combination, fail to disclose or suggest the invention as claimed. In particular, the cited references, at a minimum, fail to disclose or suggest sending attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be

cached in the disk device, and/or judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information, and/or relaying the data, which has been judged as non-cacheable, without process of the cache in the disk device, and/or an attribute information management module that manages attribute information of the data, which indicates as to whether or not the data is allowed to be cached in the disk device, or whether or not the data is required to be encrypted when being written in the disk device, and/or a judgment that judges as to whether or not the data to be provided is allowed to be cached in the disk device, based on a predetermined condition, and/or a transmission control module that transmits the data, which has been judged as cacheable, to the node device, and transmits the data, which has been judged as non-cacheable, to other computers without going through the node device, and/or means for inputting attribute information indicating as to whether or not the data to be relayed is cacheable, and/or means for judging as to whether or not the data is cacheable, based on the attribute information.

All of the independent claims recite at least one of these features or this feature, if there is only one. In particular, independent claim 1 recites in the storage device or the client, sending attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be cached in the disk device; and in the node device, judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information; and relaying the data, which has

been judged as non-cacheable, without process of the cache in the disk device.

Independent claim 3 recites an attribute information input module that inputs attribute information of the data to be relayed, which indicates as to whether or not the data is allowed to be cached in the disk device; a judgment module that judges as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information; and a cache control module that relays the data, which has been judged as non-cacheable, without process of the cache in the disk device. Independent claim 11 recites an attribute information management module that manages attribute information of the data, which indicates as to whether or not the data is allowed to be cached in the disk device, or whether or not the data is required to be encrypted when being written in the disk device; and an attribute information notification module that notifies the node device of the attribute information. Independent claim 15 recites a judgment that judges as to whether or not the data to be provided is allowed to be cached in the disk device, based on a predetermined condition; and a transmission control module that transmits the data, which has been judged as cacheable, to the node device, and transmits the data, which has been judged as non-cacheable, to other computers without going through the node device. Independent claim 19 recites means for inputting attribute information indicating as to whether or not the data to be relayed is cacheable; means for judging as to whether or not the data is cacheable, based on the attribute information; and means for relaying the data, which has been judged as non-cacheable, without process of the cache in the disk device.

The references considered most closely related to the claimed invention are briefly discussed below:

U.S. Patent Publication No. 2004/0186898 A1 (Kimura et al.) discloses enhancing reading speed of data from a disk device in a computer system capable of transmission and reception of the data via node device between a client and a storage device. A share volume PDc and specific volume PDa and PDb are defined in the disk device on the storage device. Common data among respective clients and specific data corresponding to the individual client are stored in the share volume and the specified volume, respectively. Once respective clients request virtual volumes VDa and VDb to read the data, the storage device reads out the corresponding data from the share volume or the specific volume. This application avoids lowering the reading speed regardless of the concentration of accesses from a plurality of clients because most data can be read from the share volume. Kimura et al., at a minimum, fails to disclose or suggest sending attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be cached in the disk device, and/or judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information, and/or managing attribute information of the data, which indicates as to whether or not the data is required to be encrypted when being written in the disk device, and/or judging as to

whether or not the data to be provided is allowed to be cached in the disk device, based on a predetermined condition.

U.S. Patent Publication No. 2003/0009640 A1 (Arimilli et al.) discloses a non-uniform memory access (NUMA) data processing system includes a plurality of nodes coupled to a node interconnect. The plurality of nodes contain a plurality of processing units and at least one system memory having a table (e.g., a page table) resident therein. The table includes at least one entry for translating a group of non-physical addresses that individually specifies control information pertaining to the group of non-physical addresses for each of the plurality of nodes. The control information may include a plurality of write through indicators that are each associated with a plurality of write through indicators that are each associated with a respective one of the plurality of nodes. When a write through indicator is set, processing units in the associated write node write modified data back to system memory in a home node rather than caching the data. The control information may further include a data storage control field comprising a plurality of non-cacheable indicators that are each associated with a respective one of the plurality of nodes. When a non-cacheable indicator is set, processing units in the associated node are instructed to not cache data associated with non-physical addresses within the group translated by reference to the table entry. The control information may also include coherency control information that individually indicates for each node whether or not inter-node coherency for data associated with the table entry will be maintained with software support. Arimilli et al., at a minimum, fails to disclose or suggest sending

attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be cached in the disk device, and/or judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information, and/or managing attribute information of the data, which indicates as to whether or not the data is required to be encrypted when being written in the disk device, and/or judging as to whether or not the data to be provided is allowed to be cached in the disk device, based on a predetermined condition.

U.S. Patent Publication No. 2004/0123068 A1 (Hashimoto) discloses a system and method for reducing an overhead of storing a log of each host processor in a cluster system that includes a plurality of host processors. Part of a disk cache of a disk system shared by the plurality of host processors is used as a log storage area. In order to make this possible, the disk system is provided with an interface enabled to be referred and updated from each of the host processors separately from an ordinary I/O interface. A storage processor controls an area of the disk cache used for ordinary I/O processes by means of a disk cache control table. And a storage processor controls a log area allocated in the disk cache by means of an exported segments control table. The disk cache area registered in the exported segments control table is mapped into the virtual address space of the main processor by an I/O processor. Each host processor, when accessing a disk drive, issues an I/O command. When accessing the log area, however, the host processor specifies a mapped virtual address and access the log area. Each storage

processor distinguishes between an I/O command and an access to the log area to input/output data. Hashimoto, at a minimum, fails to disclose or suggest sending attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be cached in the disk device, and/or judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information, and/or managing attribute information of the data, which indicates as to whether or not the data is required to be encrypted when being written in the disk device, and/or judging as to whether or not the data to be provided is allowed to be cached in the disk device, based on a predetermined condition.

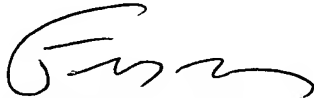
Therefore, since the references fail to disclose sending attribute information of data to the node device, the data being relayed by the node device, the attribute information indicating as to whether or not the data is allowed to be cached in the disk device, and/or judging as to whether or not the data to be relayed is allowed to be cached in the disk device, based on the attribute information, and/or relaying the data, which has been judged as non-cacheable, without process of the cache in the disk device, and/or an attribute information management module that manages attribute information of the data, which indicates as to whether or not the data is allowed to be cached in the disk device, or whether or not the data is required to be encrypted when being written in the disk device, and/or a judgment that judges as to whether or not the data to be provided is allowed to be cached in the disk device,

based on a predetermined condition, and/or a transmission control module that transmits the data, which has been judged as cacheable, to the node device, and transmits the data, which has been judged as non-cacheable, to other computers without going through the node device, and/or means for inputting attribute information indicating as to whether or not the data to be relayed is cacheable, and/or means for judging as to whether or not the data is cacheable, based on the attribute information, it is submitted that all of the claims are patentable over the cited references.

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Respectfully submitted,

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